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## TWO DISTOMES.

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### 1. PNEUMONÆCES COMPLEXUS, N. S., a NEW FROG DISTOME.

This description is based on the examination of several preserved specimens which were received from North Carolina marked "From the mouth of *Rana pipiens*."

*P. complexus* is a rather elongated worm, between 5 mm. and 8 mm. in length, and in the widest portion, about 1.7 mm. wide. The thickness is about .71 mm., a cross-section being elliptical in outline. The widest region is just forward of the middle, and from here it tapers very slightly toward the hinder end, which is rounded and blunt. Toward the forward end it tapers more rapidly, sometimes giving the worm almost the appearance of having a neck. The oral sucker is subterminal and .4 mm. in diameter. The acetabulum is 2.4 mm. from the anterior end of the animal and very slightly smaller than the oral sucker, being .38 mm. in diameter. Both suckers are sessile. All the specimens examined were smooth, *i. e.*, without spines. This may have been due, however, to maceration. Of the five species of this genus described by Stafford (1902), all are covered with spines except one, *P. longiplexus*, which is smooth. The determination of this point with respect to *P. complexus* will depend finally upon the examination of a living or freshly-killed specimen. In the specimens examined, however, there were patches where the cuticle seemed to be intact. It was very thick and there was no trace of spines. Thus the evidence seems almost conclusive that the worm is a smooth one.

The mouth is easily discernible in the center of the oral sucker, and leads to the muscular, bulb-like pharynx. The œsophagus is about .5 mm. in length. It then branches, forming the two intestinal cæca, which extend to within .4 mm. of the posterior end of the body. The cæca are rounded tubes about .15 mm. in diameter, and are without branches.

The excretory vesicle, which is tubular and in cross-section about the size of one of the intestinal cæca, is extremely long. The median portion extends from the excretory pore, which is terminally located at the posterior extremity, to a position just posterior to the acetabulum. Here it branches, forming the two crura, which extend outward and forward to about the plane of the posterior end of the œsophagus. The excretory vesicle is extremely thin-walled, and almost impossible to be seen except in sections. It is dorsal in position throughout its entire extent.

The testes are two large, very prominent organs just posterior to the middle of the animal. They are irregularly ovate in outline and are somewhat lobed. They do not both lie in the same plane, the left one usually being posterior to, but overlapping, the right. The posterior one is usually somewhat longer than the anterior, being 1.4 mm. long, while the anterior one is 1.1 mm. long. Each is about .92 mm. wide and about .78 mm. thick. The vas deferens from the left testis runs forward to the left of the right testis, lying between it and ovary. Just anterior to the shell gland it is joined by its fellow from the right testis, and from here a slightly convoluted tube extends to the genital pore. There is no cirrus or cirrus sac. The genital pore is a minute opening on the ventral side, in the same transverse plane as the pharynx and to the right of the median plane.

The ovary is a somewhat elongated organ considerably smaller than either testis. It is usually on the left side and slightly posterior to the acetabulum. Occasionally it is on the right side, and when it is so placed the testis on that side is posterior to the other. It is about .7 mm. in length, .32 mm. in width, and .32 mm. thick (dorso-ventrally). The oviduct runs from the ovary into the shell-gland where there is an ootype. The shell-gland lies in the middle of the body just posterior to the acetabulum.

The receptaculum seminis is a sac about one-half as large as the ovary. It lies just forward of and lateral to the right testis. Its duct runs forward and to the left, meeting the oviduct at its entrance into shell gland. There is no Laurer's canal.

The yolk glands are numerous, being placed in clusters along both sides of the body from the position of the pharynx to the posterior extremity of the hinder testis. There are five or six

distinct groups or clusters on each side, each group being composed of 6 to 20 glandular bodies. They are ventrally placed and follow the general course of the intestine.

The tube from the forward clusters on each side meets that from the rear clusters just inside the intestinal cæcum and in a transverse plane just posterior to the ootype. The transverse tubes meet near the median plane, well toward the dorsal body-wall, and from here a short tube leads to the yolk reservoir.

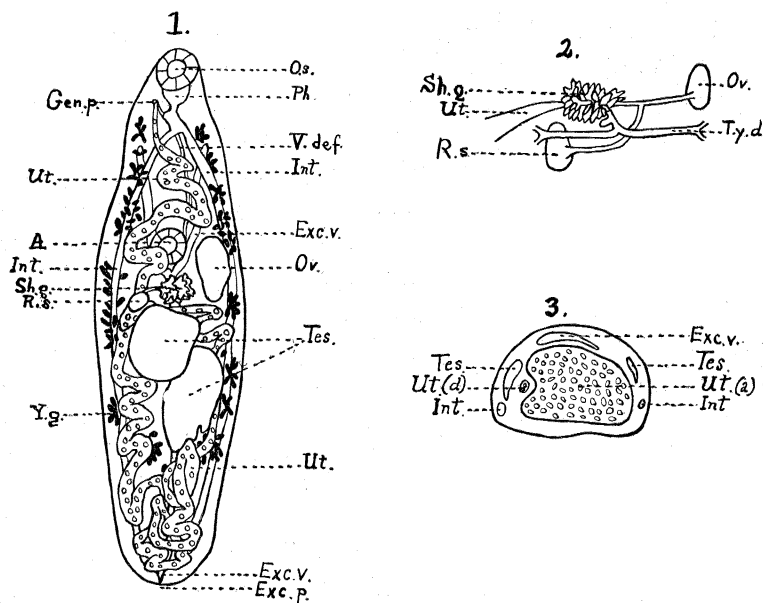


FIG. 1. *Pneumonæces complexus*, ventral aspect. O. s., oral sucker; A., acetabulum; Ph., pharynx; Int., intestinal cæcum; Exc. v., excretory vesicle; Ut., uterus; Tes., testes; R. s., receptaculum seminis; Gen. p., genital pore; Ov., ovary; Sh. g., shell gland; V. def., vas deferens; Y. g., yolk gland.

FIG. 2. Diagram of female genital organs in *P. complexus*. Ov., ovary; Sh. g., shell-gland; Ut., uterus; R. s., receptaculum seminis; T. y. d., transverse yolk duct.

FIG. 3. Cross-section of *Kenifer elongatus* in region of testes. Ut. (d), uterus, descending; Ut. (a), uterus, ascending; Tes., testis; Int., intestinal cæcum; Exc. v., excretory vesicle.

From the yolk reservoir a tube extends diagonally forward and towards the ventral body wall joining the oviduct after its entrance into the shell gland. The yolk reservoir is a pear-shaped sac about .12 mm. in length.

The uterus is a continuation of the oviduct, running to the posterior end of the animal, then forward to the genital pore. It winds about, filling the spaces between the other organs, and in the case of adult worms often nearly covers them. It is circular in cross-section, and about .15 mm. in diameter. In the adult animal this tube is filled with eggs which as they ripen take on a dark brown color, and give the worm a peculiar mottled appearance. There are no lateral longitudinal folds as in the case of most of the other species of this genus.

*P. complexus* is closely related to *P. similiplexus*, described by Stafford (1902) under the name of *Hæmatolæchus similiplexus*. The principal differences between the two species are that in *P. complexus* the testes are very much larger than in *P. similiplexus*; there are no lateral longitudinal folds of the uterus; and the eggs are considerably smaller, being .029 mm. by .014 mm. as compared with .039 mm. by .019 mm. in *P. similiplexus*. In outer characters, — size, shape, suckers, etc., — there is a close similarity between the two species. *P. similiplexus* is covered with spines, while *P. complexus* is probably smooth. In this respect *P. complexus* resembles *P. longiplexus*. In respect to the folds of the uterus it most closely resembles *P. medioplexus*. The ascending and descending coils seem however to have less regularity than in that species.

The other species of this genus are universally reported as being found in the lungs of frogs, while, as has already been noted, these specimens were labelled as having been found in the mouth of the leopard frog. Upon inquiry I found that these distomes are rarely or never found in the mouth of a living or freshly-killed animal. If, however, the frogs are killed by chloroform, and especially if they are left for some time in the killing jar, the worms, still alive, may frequently be found in the mouths of the dead animals. They may be thrown from the lungs by the struggles of the dying animal, or they may find their way to the mouth in their efforts to escape from a dead host. At any rate the above facts explain their being found in the mouth of the frog, and leave every probability that *P. complexus* is a lung parasite.

## II. RENIFER ELONGATUS PRATT.

This worm was first described by Pratt (1903) from a single specimen, mature but not yet fully grown. The object here is simply to supplement that description, by a comparison with a full-grown specimen. The worm from which the following measurements were taken was selected as the largest of about 40 or 50 specimens at hand. This worm is 5.5 mm. in length, and 1.7 mm. wide at the widest part, while that described by Pratt was 3 mm. in length, and .68 mm. in width. The thickness of the two worms is .93 mm. and .4 mm., respectively.

The oral sucker is round and about .35 mm. in diameter; the acetabulum is decidedly elliptical in outline, extending .82 mm. transversely and .6 mm. longitudinally. The corresponding measurements given by Pratt are the following: oral sucker; length, .32 mm., width, .33 mm.; acetabulum; length, .4 mm., width, .36 mm. The relative positions of the suckers on the animal are of course the same. The relative sizes of the various parts of the digestive tracts of the two worms correspond to relative sizes of the worms themselves.

The most marked difference between the two worms are the greatly increased size of the ascending limb of the uterus, and the consequent displacement of the other organs in the larger worm. In the region just back of the testes, the uterus occupies nearly two thirds of the space within the body walls, and the excretory vesicle is pressed flat against the dorsal wall, extending from one lateral margin to the other. In the region of the testes there is but little diminution in the size of the uterus, and the testes are pressed outward toward the lateral body walls, they themselves being apparently somewhat flattened (see Fig. 3). Forward of the acetabulum, the uterus rapidly decreases in size as it approaches the genital pore.

The eggs were approximately the same size as those in the smaller worm. The measurements given by Pratt are .035 mm. by .02 mm. The measurements in the larger worm were .034 mm. by .021 mm.

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